

CONTACT INFORMATION	Information & Decision Sciences Dept. Sandia National Laboratories 7011 East Avenue Livermore, CA 94551 USA	<i>Voice:</i> (925) 294 4683 <i>Fax:</i> (925) 294 2234 <i>E-mail:</i> <a href="mailto:apinar@sandia.gov">apinar@sandia.gov</a> <i>www:</i> <a href="http://csmr.ca.sandia.gov/~apinar/">csmr.ca.sandia.gov/~apinar/</a>
RESEARCH INTERESTS	Combinatorial scientific computing, modeling and analysis of complex networks, combinatorial algorithms, graph algorithms, graph data mining, parallel and high performance computing, interconnection networks, scientific computing, computational electric power systems, data analysis.	
EDUCATION	<b>University of Illinois at Urbana-Champaign (UIUC)</b> <ul style="list-style-type: none"><li>– Ph.D. in Computer Science, 2001 with the option of Computational Science and Engineering<ul style="list-style-type: none"><li>• Thesis title: “Combinatorial Algorithms in Scientific Computing,”</li><li>• Co-advisors: Michael Heath and Bruce Hendrickson</li></ul></li></ul> <b>Bilkent University, Ankara, Turkey</b> <ul style="list-style-type: none"><li>– M.S. in Computer Engineering and Information Science, 1996<ul style="list-style-type: none"><li>• Thesis title: “Decomposing Linear Programs for Parallel Solution,”</li><li>• Advisor: Cevdet Aykanat</li></ul></li><li>– B. S. in Computer Engineering and Information Science, 1994</li></ul>	
HONORS, AWARDS AND RECOGNITION	<ul style="list-style-type: none"><li>– Elected <i>Secretary of SIAM Activity Group on Supercomputing</i> (Jan 1, 2008–Dec 31, 2009).</li><li>– Research Grant (2009–2012), Principal Investigator “Scalable Methods for Representing, Characterizing, and Generating Large Graphs,” funded by DOE Office of Science, Applied Mathematics program \$2.1M/3 years</li><li>– Research Grant (2004–2007), Principal Investigator “Advanced Computational Tools for Electric Power Systems,” funded under the Laboratory Directed Research Program for \$650K/3 years</li><li>– Research Grant (2001–2004), Principal Investigator “Combinatorial Algorithms and Scientific Computing,” funded under the Laboratory Directed Research Program for \$265K/3 years</li><li>– SPOT Awards<ul style="list-style-type: none"><li>– Sandia National Laboratories, 2009, 2009</li><li>– Lawrence Berkeley National Laboratory 2005</li></ul></li></ul>	

- *John Von Neumann Research Fellowship in Computational Science*,  
by Sandia National Laboratories, 2001 (declined)
- *Alston S. Householder Fellowship in Scientific Computing*,  
by Oak Ridge National Laboratory, 2001 (declined)
- *Outstanding Graduate Student Service Award*,  
Dept. of Computer Science, U. of Illinois at Urbana-Champaign, 2000

#### PROFESSIONAL EXPERIENCE

- Member of Technical Staff (Oct 2008 – )  
Sandia National Laboratories
- Computer Systems Engineer III, (May, 2004 – Oct 2008)  
Lawrence Berkeley National Laboratory
- Postdoctoral Researcher, (Oct, 2001 – May, 2004)  
Lawrence Berkeley National Laboratory
- Visiting Researcher, (summers 1999, 2000)  
Sandia National Laboratories
- Research Assistant, (Aug, 1997 – Aug, 2001)  
Department of Computer Science  
Computational Science and Engineering Program, UIUC
- Teaching Assistant, (Sep., 1994 – July 1997)  
Dept. of Computer Engineering and Information Science,  
Bilkent University, Ankara, Turkey

#### TEACHING AND SUPERVISING EXPERIENCE

- Teaching Assistant for
  - Algorithms (for senior students)
  - Program Verification (for junior and senior students)
  - Combinatorics and Graph Theory (for junior students)
- Supervisor for
  - Vanessa Lopez, postdoctoral fellow, 2005–2006, now at IBM T.J. Watson
  - Adam Reichert, summer student, 2006, (UIUC)
  - Yonatan Fogel, summer student, 2006, State University of New York at Stony Brook
  - Virginia Vassilevska, summer student, 2004, Carnegie Mellon University
  - Manmeet Singh, summer student, 2003, UIUC
  - Tao Tao, summer student, 2002, UIUC
  - Feida Zhu, summer student, 2002, UIUC

#### JOURNAL PUBLICATIONS

1. C. Janssen, H. Adalsteinsson, S. Cranford, J. Kenny, A. Pinar, D. Evensky, and J. Mayo, “A Simulator for Large-scale Parallel Computer Architectures,” to appear in International Journal of Distributed Systems and Technology.

2. A. Pinar, J. Meza, V. Donde, and B. Lesieutre, "Optimization Strategies for the Vulnerability Analysis of the Power Grid," *SIAM Journal on Optimization*, Vol. 20, No. 4, pages 1786–1810, 2010.
3. S. Kamil, L. Olike, A. Pinar, and J. Shalf, "Communication Requirements and Interconnect Optimization for High-End Scientific Applications," *IEEE Transactions on Parallel and Distributed Computing*, Vol. 21, No. 2, pages 188–202, 2010.
4. A. Pinar, E. Tabak, and C. Aykanat, "One dimensional partitioning for heterogeneous systems," *Journal of Parallel and Distributed Computing*, Vol. 68, No. 11, pages 1473–1486, 2008.
5. V. Donde, V. Lopez, B. Lesieutre, A. Pinar, C. Yang, and J. Meza, "Severe Multiple Contingency Screening in Electric Power Systems," *IEEE Transactions on Power Systems*, Vol. 23, No. 2, pages 406–417, 2008.
6. A. Pinar, E. Chow, and A. Pothien, "Combinatorial Techniques for Constructing Sparse Null-space Bases," *Electronic Transactions on Numerical Analysis, special volume on saddle point problems: numerical solution and applications*, Vol. 22, pages 122–145, 2006.
7. A. Pinar and B. Hendrickson, "Improving Load Balance with Flexibly Assignable Tasks," *IEEE Transactions on Parallel and Distributed Systems*, Vol. 16, No. 10, pages 956–965, 2005.
8. A. Pinar and V. Vassilevska, "Finding Nonoverlapping Substructures of a Sparse Matrix," *Electronic Transactions on Numerical Analysis, special volume on combinatorial scientific computing*, Vol. 21, pages 107–124, 2005.
9. A. Pinar and B. Hendrickson, "Interprocessor Communication with Limited Memory," *IEEE Transactions on Parallel and Distributed Systems*, Vol. 15, No. 7, pages 606–616, 2004.
10. A. Pinar and C. Aykanat, "Fast Optimal Load Balancing Algorithms for 1D Partitioning," *Journal of Parallel and Distributed Computing*, Vol. 64, No. 8, pages 974–996, 2004.
11. C. Aykanat, A. Pinar, and U. Catalyurek, "Permuting Sparse Rectangular Matrices into Block-Diagonal Form," *SIAM Journal on Scientific Computing*, Vol. 25, No. 6, pages 1860–1879, 2004.
12. A. Pinar and C.L. Liu, "Compacting Sequences with Invariant Transition Frequencies," *ACM Transactions on Design Automation of Electronic Systems*, Vol. 8, No. 2, pages 214–221, 2003.
13. E. Kayaaslan, A. Pinar, U. Catalyurek, and C. Aykanat, "Partitioning Hypergraphs in Scientific Computing Applications through Vertex Separators on Graphs," submitted to SIAM J. Scientific Computing.

14. A. Pinar, D. Rotem, and E. Otoo, “A Linear-time Approximation Algorithm for Packing Disks,” in preparation.
15. I. Stanton and A. Pinar, ” Constructing and uniform sampling graphs with prescribed joint degree distribution using Markov Chains ”, in preparation.
16. A. Pinar, “Complexity Results on the Nice Basis Problem,” in preparation.

#### BOOK CHAPTER

17. A. Pinar and B. Hendrickson, “Combinatorial Parallel and Scientific Computing,” chapter in *Parallel Processing for Scientific Computing*, editors: M. Heroux, P. Raghavan, and H. Simon, SIAM, 2006.

#### REFEREED

#### CONFERENCE PUBLICATIONS

18. I. Stanton and A. Pinar, “Constructing and sampling graphs with prescribed joint degree distribution using Markov Chains, ” to appear in *Proc. ALENEX 11*.
19. M. Rocklin and A. Pinar, “Computing an Aggregate Edge-weight function for Clustering Graphs with Multiple Edge Types”, in *Proc. 7th Workshop on Algorithms and Models for the Web Graph (WAW10)*.
20. B. Lesieutre, A. Pinar, and S. Roy, “Power System Extreme Event Detection: The Vulnerability Frontier,” in *Proc. 41st Hawaii International Conference on System Sciences*, pages: 184, Waikoloa, Big Island, HI, 2008.
21. S. Kamil, A. Pinar, D. Gunter, M. Lijewski, L. Oliker, and J. Shalf, “Reconfigurable hybrid interconnection for static and dynamic scientific applications,” *Proc. of the 4th International Conference on Computing Frontiers*, pages: 183–195, Ischia, Italy, 2007.
22. A. Pinar, A. Reichert, and B. Lesieutre, “Computing Criticality of Lines in a Power System,” *Proc. 2007 IEEE International Symposium on Circuits and Systems*, pages = 65–68, New Orleans, LA, May 2007.
23. B. Lesieutre, S. Roy, V. Donde, and A. Pinar, “Power system extreme event analysis using graph partitioning,” *Proc. the 39th North American Power Symposium*, Carbondale, IL, October 2006.
24. A. Pinar, T. Tao, and H. Ferhatosmanoglu, “Compressing Bitmap Indices by Data Reorganization,” *Proc. 21st International Conference on Data Engineering (ICDE05)*, pages: 310–321.
25. V. Donde, V. Lopez, B. Lesieutre, A. Pinar, C. Yang, and J. Meza, “Identification of severe multiple contingencies in electric power networks,” *Proc. the 38th North American Power Symposium*, Ames, IA, October 2005.
26. A. Pinar and B. Hendrickson, “Exploiting Flexibly Assignable Work to Improve Load Balance,” *Proc. ACM 14th Symp. Parallel Algorithms and Architectures (SPAA) 2002*, pages 155–163.

27. A. Pinar and B. Hendrickson, "Graph Partitioning for Complex Objectives," *Proc. 15th International Parallel and Distributed Processing Symp. (IPDPS)*, IEEE, 2001.
28. A. Pinar and B. Hendrickson, "Communication Support for Adaptive Computation," in *Proc. SIAM Conf. on Parallel Processing for Scientific Computing*, 2001.
29. A. Pinar and B. Hendrickson, "Interprocessor Communication with Memory Constraints," *Proc. ACM Symp. Parallel Algorithms and Architectures (SPAA)* 2000, pages 39–45.
30. L. Fleischer, B. Hendrickson, and A. Pinar, "On Identifying Strongly Connected Components in Parallel," *Lecture Notes in Computer Science*, Vol. 1586, pages 505–511.
31. A. Pinar and M. Heath, "Improving Performance of Sparse Matrix-Vector Multiplication," *Proc. Supercomputing 99*, 1999.
32. A. Pinar and C.L. Liu, "Power Invariant Vector Sequence Compaction," *Proc. 1998 IEEE/ACM International Conf. Computer Aided Design*, pages 473–476, 1998.
33. A. Pinar and C. Aykanat, "Sparse Matrix Decomposition with Optimal Load Balancing," *Proc. International Conf. High Performance Computing (HiPC)* 97, pages 224–229, 1997.
34. A. Pinar and C. Aykanat, "An Effective Model to Decompose Linear Programs for Parallel Solution," *Lecture Notes in Computer Science*, Vol. 1184, pages 592–601.
35. A. Pinar, U. Catalyurek, C. Aykanat, and M. Pinar, "Decomposing Linear Programs for Parallel Solution," *Lecture Notes in Computer Science*, Vol. 1041, pages 473–482.
36. A. Pinar, "A New Genetic Algorithm for Hypergraph Partitioning," *Proc. Turkish Artificial Intelligence and Neural Networks Symp. (TAINN) 96*, pages 167–176, 1996.
37. A. Pinar and U. Cetintemel, "Wide-Area Distributed Selective Dissemination of Information," *Proc. Tenth International Symp. on Computer and Information Sciences (ISCIS)*, pages 281–288, 1995.

#### OTHER PUBLICATIONS

38. S. Poon, A. Pinar, C. Aragon, and P. Nugent, "Time-Domain Visual Analytics for Astronomical Scheduling," submitted to IEEE Visual Analytics Science and Technologies Conference.
39. E. Otoo, A. Pinar, D. Rotem, and S. C. Tsao, "A File Allocation Strategy for Energy-Efficient Disk Storage Systems," Technical Report: LBNL-637E, Lawrence Berkeley National Laboratory, Berkeley, CA.

40. A. Pinar, Y. Fogel, and B. Lesieutre, "The Inhibiting Bisection Problem, Technical Report: LBNL-62142, Lawrence Berkeley National Laboratory, Berkeley, CA.
41. P. Cesarz, G. Pomann, L. Torre, G. Villarosa, T. Flournoy, A. Pinar, and J. Meza, "Detecting Network Vulnerabilities Through Graph Theoretical Methods," Technical Report: LBNL-63487, Lawrence Berkeley National Laboratory, Berkeley, CA.
42. A. Pinar, "High Performance Combinatorial Algorithms," Technical Report: LBNL- 53989, Lawrence Berkeley National Laboratory, Berkeley, CA.
43. A. Pinar, M. Singh, and E. Ng, "Nested Dissection Orderings for LU Factorization of Unsymmetric Matrices with Static Pivoting," extended abstract in Proc. SIAM Workshop on Combinatorial Scientific Computing.
44. A. Pinar, "Combinatorial Algorithms in Scientific Computing," PhD. Thesis, University of Illinois at Urbana-Champaign, July 2001.
45. A. Pinar, "Decomposing Linear Programs for Parallel Solution," M.S. Thesis, Bilkent University, Ankara, Turkey, July 1996.

CONFERENCE  
PRESENTATIONS  
AND INVITED  
TALKS

1. "Computing an Aggregate Edge-weight function for Clustering Graphs with Multiple Edge Types", *7th Workshop on Algorithms and Models for the Web Graph (WAW10)*, Stanford, CA, December, 2010.
2. "Scalable Methods for Representing, Characterizing, and Generating Large Graphs," SIAM Annual Meeting, Pittsburgh, PA, July, 2010.
3. "Networks in Modeling and Simulation," SIAM Conf. on Parallel Processing for Scientific Computing, Seattle, WA, February, 2010.
4. "A Simulator for Large-scale Parallel Computer Architectures," poster presentation, SIAM Conf. on Parallel Processing for Scientific Computing, Seattle, WA, February, 2010.
5. "Scalable Interconnects for Scientific Workloads" SIAM Conf. on Computational Science and Engineering, Miami, FL, March 2009.
6. "Scalable Reconfigurable Interconnects, "Workshop on Combinatorial Scientific Computing & Petascale Simulations (CSCAPES), Santa Fe, NM, June 2008.
7. "Combinatorial methods in scientific computing," Center for Advanced Computational Research Seminar, California Institute of Technology, May 2008
8. "Combinatorial Scientific Computing," Department Colloquium, Computer Science and Engineering, UC Riverside, March, 2008.
9. "Vulnerability Analysis of the Power Grid," Mathematical Sciences Research Institute Seminar, Berkeley, CA, June 2007.

10. "Vulnerability Analysis of the Power Grid," Georgia Institute of Technology High Performance Computing Seminar, Atlanta, GA, February 2007.
11. "Vulnerability Analysis of the Power Grid," SIAM Conf. on Computational Science and Engineering, Mesa Verde, CA, February 2007.
12. "Advanced Computational Tools for Electric Power Systems," SIAM Annual Meeting, Boston, MA, July 2006.
13. "Improving Performance of Bitmap Indexing," SIAM Workshop on Combinatorial Scientific Computing, Toulouse, France, June 2005
14. "Alternative Models for Load Balancing," SIAM Conf. on Parallel Processing for Scientific Computing 2004, San Francisco, California, February, 2004.
15. "Nested Dissection Orderings for LU Factorization with Static Pivoting," SIAM Workshop on Combinatorial Scientific Computing, San Francisco, California, February, 2004.
16. "Combinatorial Techniques for Constructing Sparse Null-space Bases," SIAM Conf. on Applied Linear Algebra, Williamsburg, VA, July 2003.
17. "The Nice Basis Problem," Bay Area Scientific Computing Day, Stanford University, March, 2003.
18. "The Nice Basis Problem," Mathematics and Computer Science Division Seminar, Argonne National Laboratory, May, 2003.
19. "Exploiting Flexibly Assignable Work to Improve Load Balance," SIAM 50th Anniversary and 2002 Annual Meeting, Philadelphia, Pennsylvania, July, 2002.
20. "Partitioning for Complex Objectives," International Parallel and Distributed Processing Symp., San Francisco, California, April, 2001.
21. "Combinatorial Algorithms for Adaptive Computation," NERSC Scientific Computing Seminar, Berkeley, California, April, 2001.
22. "Communication Support for Adaptive Computation," SIAM Conf. on Parallel Processing for Scientific Computing 2001, Portsmouth, Virginia, March, 2001.
23. "Interprocessor Communication with Memory Constraints," ACM Symp. on Parallel Algorithms and Architectures (SPAA), Bar Harbor, Maine, July, 2000.
24. "On Identifying Strongly Connected Components in Parallel," International Parallel and Distributed Processing Symp. (IPDPS), Cancun, Mexico, May, 2000.
25. "Improving Performance of Matrix-Vector Multiplication," Supercomputing 99, Portland, Oregon, November, 1999.
26. "Power Invariant Vector Sequence Compaction," International Conf. on Computer Aided Design, San Jose, California, November, 1998.
27. "An Effective Graph Model to Decompose Linear Programs for Parallel Solution," PARA96, Workshop on Applied Parallel Computing in Industrial Problems and Optimization, Lyngby, Denmark, August, 1996.

28. "A New Genetic Algorithm for Hypergraph Partitioning," Artificial Intelligence and Neural Network Symp., Istanbul, Turkey, June, 1996.
29. "Wide-Area Distributed Selective Dissemination of Information," International Symp. on Computer and Information Systems, Izmir, Turkey, November, 1995.
30. "Decomposing Linear Programs for Parallel Solution," Bilkent University, Dept. of Computer Science Seminar, Ankara, Turkey, December, 1995

#### PROFESSIONAL SOCIETY MEMBERSHIPS

- Society of Industrial and Applied Mathematics (SIAM)
- Association of Computing Machinery (ACM)
- IEEE Computer Society
- SIAM activity groups on
  - Supercomputing
  - Optimization
  - Computational Science and Engineering

#### SERVICES AND MEMBERSHIPS

- Co-chair, SIAM Workshop on Combinatorial Scientific Computing, 2011.
- Program Committee Member,
  - 31st International Conference on Distributed Computing Systems (ICDCS 2011), Minneapolis, Minnesota, June 2011.
  - SIAM Conference on Parallel Processing for Scientific Computing, Seattle, Washington, February, 2010.
  - 24th International Symposium on Computer and Information Sciences (ISCIS 2009), Northern Cyprus.
  - 4th SIAM Workshop on Combinatorial Scientific Computing, Monterey, CA, October 2009.
  - 22nd IEEE International Parallel and Distributed Processing Symposium, Miami, Florida, USA, April 2008.
  - 2nd International Conference on Grid and Pervasive Computing, Paris, France, May 2007.
  - 35th Annual International Conference in Parallel Processing, Columbus Ohio, August 2006.
  - 1st International Conference on Grid and Pervasive Computing, Taichung, Taiwan, May 2006.
  - 12th Annual International Conference on High Performance Computing (HiPC), Goa, India, 2005.
  - 19th International Symposium on Computer and Information Sciences (ISCIS), Antalya, Turkey, 2004.
- Minisymposium Organizer,



- “Combinatorial Scientific Computing: Enabling Computational Science and Engineering through Combinatorial Algorithms, International Conference on Industrial and Applied Mathematics, Vancouver, Canada, July 2011.
- “Optimization in Electric Power Systems, SIAM Conference on Computational Science and Engineering, Reno, NV, February, 2011.
- “Combinatorial Methods in Applications of CSE, SIAM Conference on Computational Science and Engineering, Reno, NV, February, 2011.
- “Spectral Theory and Graphs, SIAM Conference on Computational Science and Engineering, Reno, NV, February, 2011.
- “Mathematics of Complex Distributed Interconnected Systems,” SIAM Annual Meeting, Pittsburgh, PA, July 2010.
- “Combinatorial Scientific Computing,” SIAM Annual Meeting, Denver, CO, July 2009.
- “Optimization with Discrete and Continuous Variables,” SIAM Conference on Computational Science and Engineering, Mesa Verde, California, February, 2007.
- “Computational Challenges in Electric Power Systems,” SIAM Conference on Parallel Processing for Scientific Computing, San Francisco, California, February, 2006.
- “Parallel Graph Algorithms,” SIAM Conference on Parallel Processing for Scientific Computing, San Francisco, California, February, 2006.
- “Computational Challenges in Electric Power Systems,” SIAM Conference on Computational Science and Engineering, Orlando, Florida, February, 2005.
- “Combinatorial Algorithms and Parallel Computing,” SIAM Conference on Parallel Processing for Scientific Computing, San Francisco, California, February, 2004.
- “Combinatorial Algorithms in Scientific Computing,” SIAM Conference on Computational Science and Engineering, San Diego, California, February, 2003.
- Review Panel Member
  - Programs for DOE Office of Science Advanced Scientific Computing Research, 2009 , 2010.
  - NSF Information & Intelligent Systems Division, 2010
- Volunteer mentor for MentorNet (<http://www.mentornet.net/>)
- Reviewer, SIAM Journal on Scientific Computing, SIAM Journal on Optimization, SIAM Journal on Discrete Mathematics, SIAM Review, SIAM Matrix Analysis, IEEE T. Parallel and Distributed Systems, ACM T. on Mathematical Software, Mathematical and Computer Modeling, Journal of Parallel and Distributed Computing, Electronic Transactions on Numerical Analysis, and Parallel Algorithms and Applications, Parallel Computing, Knowledge and Information Systems, and many conferences.
- Member, Graduate Study Committee, Dept. of Computer Science, UIUC, 2000-2001.
- Member, Fellowships, Assistantships, and Admissions Committee, Dept. of Computer Science, UIUC, 1999-2000.

- Elected President of Faculty of Engineering Student Board, Bilkent University, Turkey (1992–1993).
- Elected Secretary of Faculty of Engineering Student Board, Bilkent University, Turkey (1991–1992).
- Secretary, IEEE Bilkent Student Branch, Bilkent University, Turkey (1991–1992).
- Founding member, Alumni Association of Istanbul High School of Sciences.